Conditional statement
If $\angle 1$ and $\angle 2$ are vertical angles, then $\angle 1 \cong \angle 2$.

Contrapositive
If $\angle 1$ is not congruent to $\angle 2$, then $\angle 1$ and $\angle 2$ are not vertical angles.

5-3 Indirect Proof

Indirect Proof
1. Assume conclusion is false
2. Reason until you contradict the given
3. State assumption is false

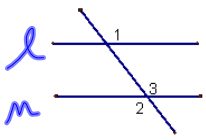
Example 1
Given: Mary received an A on the test.

Prove: Her grade was $\geq 90\%$.

Assume Mary earned an 89.
If she earned an 89 she would have received a B.
*Contradiction of given
Our assumption is false
Marys grade was $\geq 90\%$

Example 2
Given: $\angle 1 \ncong \angle 2$

Prove: $\angle 1 \ncong \angle 3$



Assume $\angle 1 \cong \angle 3$
then $l \parallel m$ b/c if corr $\angle$s are $\cong$, then lines are $\parallel$.
If the lines are $\parallel$, then $\angle 1 \cong \angle 2$ b/c alt ext $\angle$s are $\cong$.
*Contradicts our given.
Our assumption is false
$\angle 1 \ncong \angle 3$

Example 4

Given: $\frac{1}{2y + 4} = 20$

Prove: $y \neq -2$

Assume $y = -2$.

$\frac{1}{2(-2)+4} = 20 \rightarrow \frac{1}{0} = 20$

Impossible ↯ Contradicts given

Our assumption is false

$y \neq -2$

Homework
p. 258 #s 13-17, 19, 22
not 15

5.3 before 5.2